

much larger number of observations from the waters within a degree or two of the coast of the United States and outside the areas covered by the convergence of important steamer lanes. Such an increased number of offshore water-temperature observations would be useful, since the majority of inquiries concerning water-surface temperatures which come to the Weather Bureau from outside the professional meteorological and oceanographic circles, are for temperatures largely within these coastal waters, for which, as shown on chart 1, the Marine Division has fewest observations available per 1° square. In one case, for example, an inquirer asked the Weather Bureau to furnish the average temperature departures from normal for each of several days in an area of less than a degree in extent. The Marine Division receives about one observation a year from this particular small area, while at least 10 observations a day would be needed to compute even the probable sign of a departure from normal for each of a succession of days. This would be about 4,000 times as many observations per year for the area as are now available.

The making of requests far beyond the existing limitations of the number of available observations and the

capacity of the Marine Division personnel is not confined, however, entirely to the nonprofessional inquirer. An eminent scientist outside the Weather Bureau, at one time requested that the water-surface temperatures for each five-mile zone of distance from land be separately classified in the Marine Division tabulations of nearshore water temperatures, for two areas, one of which is indicated on chart 1 as an area from which the Weather Bureau cannot depend on as many as one observation a month for even a strip 70 miles wide and 70 miles long.

The Marine Division answers such inquiries to the best of its ability, and an attempt is made to supply all feasibly available information. Many of the requests for information, even some with which it is impossible to comply because of limited facilities and personnel, are entirely reasonable. A large class of these inquiries can be answered, in part at least, and for the first time by the present set of charts. It is hoped that these charts will therefore prove helpful not only to the forecasters for whom they were primarily intended, but also to the casual, but serious-minded student of meteorology or oceanography as well.

NOTES AND REVIEWS

The Effect of the Magnetic Storm, January 22-26, 1938, on Telegraphic Transmission.¹ By CHARLES M. LENNAHAN. On January 22, 1938, the reception of telegraphic signals of the regular 7:30 a. m., eastern standard time, weather observations was seriously delayed at the San Francisco district forecast center. It was not until 12:23 p. m., eastern standard time, that the final sheet of signals was received. This unusual situation was the result of interference in telegraphic transmission caused by one of the severe magnetic storms accompanying the present period of maximum sunspot activity; brilliant auroral displays were also observed, especially on January 26.

The interference in telegraphic transmission was most pronounced on the transcontinental lines; it began on January 22 and increased in intensity until the afternoon of January 25, at which time the potential induced in the transmission lines was occasionally in excess of 400 volts in many parts of the country. When these foreign potentials exceeded the potentials regularly used on the telegraph circuits, operation had to be suspended. A similar situation existed on the ocean cable circuits. The surges of electricity induced by the storm seldom lasted more than 10 minutes, but the frequency with which the surges occurred and the rate at which the potential increased from zero to a maximum were the greatest ever experienced. However, the telegraph lines were not affected as much as during previous years because of improved methods recently developed and inaugurated to combat such interference.

After the maximum interference was reached on January 25, conditions improved rapidly and the circuits were back to normal on the afternoon of January 26.

Auroras of January 21-22 and 25-26, 1938. By WILLIS E. HURD. At 2:27 a. m. of January 22, 1938, Second Officer Flint, of the American steamer *Coast Merchant*, bound from Tacoma to Bellingham, Wash., observed what he termed "a very unusual display of Aurora Borealis." The ship was then off Alki Point. Fifteen minutes after the first reddish auroral glow was seen, the entire northern half of the sky was alight with beams of various colors that extended toward the zenith, while in the southern

sky the streamers were mostly white. The display, with irregular but generally diminishing intensity, lasted until daylight.

During the night of the 21st-22d, the phenomenon of the Northern Lights was visible over much of the western part of the United States, accompanied by magnetic disturbances. At Roswell, N. Mex., on the 21st, it was reported by the Weather Bureau as being the first known occurrence of the character in that vicinity, and at San Diego, Calif., on the morning of the 22d, as the third of record there. It was seen at least as far to the eastward in the United States as Lacrosse, Wis., on the 22d; and was in addition reported near 30½° N., 75° W., by the American steamer *Chilore*, in the North Atlantic.

The auroral display of January 25-26 was even more magnificent and widespread, but was especially pronounced over Europe, the North Atlantic Ocean, and the eastern part of the United States and Canada. Isolated reports from the Weather Bureau Offices at Huron, S. Dak., and Madison, Wis., show that it was also seen faintly in localities to the westward.

The phenomenon, where seen in richest form and coloring, was observed from about 6:30 p. m. (local) of the 25th until approximately 1 a. m. of the 26th. This aurora, according to E. W. Barlow, in *The Meteorological Magazine* (London) for February 1938 "was accompanied by a great magnetic storm." In parts of the northeastern United States there was some interruption to telegraphic communications.

According to *Nature* (London) in its issue of February 8, 1938 (vol. 141, pp. 232-235): "Three periods of brilliant display were noted, around 7:45, 8:30, and 9:45. The main features noted were red glows in the northwest and northeast, with a low green arc between during the early stages, green and white rays traversing a bright red glow in the north-northeast about 7:45, and rapidly fluctuating green streamers between northwest and northeast about 9:45."

In the eastern United States, as well as on the North Atlantic Ocean, the predominant color was a pinkish to dull red, but often with light beams cast against the ruddy background. At Providence, R. I., the aurora was extremely vivid from sunset until 7:45 p. m., with great

¹ This note is based on information supplied by Maj. E. H. Bowle, Official in Charge, Weather Bureau Office, San Francisco, Calif., and by J. C. Willever, first vice president of the Western Union Telegraph Company.

arches of crimson light and radiations from an auroral crown near the zenith. Here it was noted as being the most brilliant display since March 22, 1920. At Norfolk, Va., there were small patches of red light; and at Augusta and Savannah, Ga., faint pink to darker red glows.

A number of ships reporting to the Weather Bureau or to the Hydrographic Office, indicate the wide extent of the phenomenon as witnessed on the North Atlantic. Some sections of the ocean were heavily clouded, which prohibited a view, while others were partly clouded to clear. In partly obscured areas the spectacle was enhanced by comparison with cumulonimbus or other dark clouds.

A tentative charting of ships' auroral observations for the Atlantic covers the region extending from near the west coast of Portugal west-southwestward nearly to Bermuda and farther southward and westward almost to the Bahamas. The most southerly observation found is that

reported by Third Officer W. Chapman, of the British motorship *Northern Prince*, New York to Rio Janeiro. While, in his special report, this observer did not give the ship's position on the evening of the 25th, yet the local noon positions given for the 25th (27°13' N., 58°37' W.) and 26th (22°13' N., 53°51' W.) indicate that the 2 hours' auroral display was seen on ship at approximately the twenty-fifth parallel. Almost as far south, but much farther to the eastward, in 29°20' N., 31°47' W., the phenomenon was reported by the French steamer *Commissaire Ramel*. The westernmost Atlantic observations of the aurora was received by the Hydrographic Office from the Greek steamer *Adamas* and the Dutch steamer *Nederland*. Both ships on the evening of the 25th were in or within a few minutes of 27° N., 71°10' to 71°57' W. Third Officer A. Bijl, of the *Nederland*, reported a remarkably red sky extending to an altitude of 35°.

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[RICHMOND T. ZOCH, in Charge of Library]

By AMY D. PUTNAM

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